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Indian Standard
METHODS OF TEST FOR INTERNAL
PRESSURE RESISTANCE OF
GLASS CONTAINERS

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NEW DELHI 110002

Indian Standard

METHODS OF TEST FOR INTERNAL PRESSURE RESISTANCE OF GLASS CONTAINERS

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Indian Standard
**METHODS OF TEST FOR INTERNAL
PRESSURE RESISTANCE OF
GLASS CONTAINERS**

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 March 1983, after the draft finalized by the Glass Containers Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 The methods cover the determination of the breaking strength of glass containers when subjected to internal pressure. The methods are intended to determine the pressure strength of containers manufactured to contain products reasonably expected to develop a sustained pressure of 140 kPa or above.

0.2.1 The test pressure limits for the containers have been specified in the relevant specifications on the glass bottles for aerated drinks and glass beer bottles.

0.3 The methods detailed here are based on the ISO/DIS 7458 'Glass container internal pressure resistance — Test method', issued by the International Organization for Standardization (ISO).

1. SCOPE

1.1 This standard specifies the test methods for the determination of the internal pressure resistance of glass containers.

2. SAMPLING

2.1 The test is performed on a predetermined number of containers. The containers used for the test shall not have been subjected to any other mechanical or thermal test which could adversely affect their internal pressure resistance.

3. METHODS OF TEST

3.1 Method A — Application of Uniform Internal Pressure for a Pre-determined Period

3.1.1 Apparatus

3.1.1.1 The apparatus shall comply with the following principles:

- a) The container to be tested shall be held in such a manner that it is suspended by the finish;
- b) There shall be a resilient seal between the sealing surface and the pressure head to retain the pressuring medium during the test; and
- c) There shall be means of applying fluid pressure to a predetermined level at a rate of 1 ± 0.2 MPa/s for maintaining that pressure constant during the test.

3.1.2 Procedure

3.1.2.1 Allow the containers to achieve ambient temperature and then fill them with water at a temperature $\pm 5^\circ\text{C}$ from ambient.

3.1.2.2 Use one of the following test procedures, depending upon the purpose of the test:

- a) *Pass Test* — Apply the internal test pressure to the predetermined level and hold it constant for 60 ± 2 s or for a different period, provided that the apparatus has the means for correcting the pressure values to those which would be obtained for a 60 s test.
- b) *Progressive Test* — Continue the test described in 3.1.2.2(a) by increasing the pressure by increments of 0.1 or 0.2 MPa until 50 percent or/and 100 percent of containers are broken.

3.1.3 Test Report

3.1.3.1 The test report shall include the following:

- a) Number of this Indian Standard;
- b) The sample size and method of sampling;

- c) Number of containers from each mould included in the sample;
- d) Type of test, that is, 3.1.2.2 (a) or (b);
- e) Test results:

- i) For the 'pass test' in accordance with 3.1.2.2 (a)

Pressure used and number of containers that failed in the test with the respective pressure.

- ii) For the 'progressive test' in accordance with 3.1.2.2 (b)

Pressure at which first failure occurred and number of containers that failed at that pressure;

Pressure required to break the predetermined percentage of the sample, expressed to the nearest 0.01 MPa; and

Mean breaking pressure and the standard deviation.

3.2 Method B — Application of Internal Pressure Increasing at a Predetermined Constant Rate

3.2.1 Apparatus

3.2.1.1 The apparatus shall comply with the following principles:

- a) The bottle to be tested shall be held in such a manner that it is suspended by the finish.
- b) There shall be a resilient seal between the sealing surface and the pressure head to retain the pressurizing medium during the test.
- c) There shall be means of applying fluid pressure increasing at a rate of 1–0.2 MPa/s until the container fails or a predetermined level is reached. The rate of increase of pressure shall be reproducible to ± 2 percent.
- d) The apparatus shall include means of indicating the pressure level at which the container failed or the maximum pressure reached during the test.
- e) The apparatus shall include means of indicating the relationship between the constant rate and fixed duration test.

3.2.2 Procedure

3.2.2.1 Allow the containers to achieve ambient temperature and then fill them with water at a temperature $\pm 5^\circ\text{C}$ from ambient.

3.2.2.2 Use one of the following test procedures, depending upon the purpose of the test:

- a) *Pass Test* — Increase the internal test pressure at a rate of 1—0·2 MPa/s until a predetermined level of pressure has been reached.
- b) *Progressive Test* — Increase the internal test pressure at a rate of 1—0·2 MPa/s until each container breaks.

3.2.3 Test Report

3.2.3.1 The report shall include the following:

- a) Number of this Indian Standard;
- b) The sample size and method of sampling;
- c) Number of containers from each mould included in the sample;
- d) Type of test, that is, **3.2.2.2** (a) or (b);
- e) Test results:

- i) For the 'Pass Test' in accordance with **3.2.2.2** (a)

Pressure used and the number of containers that failed in the test with the respective pressure.

- ii) For the 'Progressive Test' in accordance with **3.2.2.2** (b)

Pressure level at which first failure occurred.

Number of containers that failed at that pressure.

Pressure required to break the predetermined percentage of the sample, expressed to the nearest 0·01 MPa.

Mean breaking pressure and the standard deviation.